

FORCES, ENERGY, AND MOTION

TARGETED NH FRAMEWORKS FOR SCIENCE LITERACY

S:PS2:8:1.5 Given a real-world example, show that within a system, energy transforms from one form to another (i.e., chemical, heat, electrical, gravitational, light, sound, mechanical). [PS2(5-8)SAE+POC-6]

S:PS2:8:3.6 Use data to draw conclusions about how heat can be transferred (convection, conduction, radiation). [PS2(5-8)INQ+SAE+POC-7]

S:PS3:8:1.3 Use data to determine or predict the overall (net) effect of multiple forces (e.g., friction, gravitational, magnetic) on the position, speed, and direction of motion of objects. [PS3(5-8)INQ+POC-8]

S:PS3:8:2.2 Explain how the motion of an object can be described by its position, direction of motion, and speed; and illustrate how that motion can be measured and represented graphically.

CHILD-FRIENDLY ESSENTIAL STANDARD(S)

I can take a real-world situation and illustrate how energy transforms from one form to another.

I can demonstrate the 3 ways that heat is transferred from one substance to another.

I can predict what an object will do when force is transferred to that object.

I am able to use scientific terms and drawings to describe the motion of an object.

PRIOR KNOWLEDGE (presented in previous grade levels)

Grade 3 explores light from the sun in terms of reflection and absorption

Grade 4 study of simple machines involves the study of the following concepts:

- Students should be able to define a force as a push or pull
- Students should understand that if there is movement, work is being done, and if there is no movement, no work is being done
- Students have measured force in joules to determine how effort affects distance

Grade 4 unit on magnetism and electricity involves the following concepts:

- study of static electricity
- introduction to magnetism - poles

- construction of series circuits

Grade 5 unit on magnetism and electricity involves the following concepts:

- introduction to electromagnetism
- students are instructed that within a battery, chemical energy is converted to electrical energy
- Students construct parallel circuits

ESSENTIAL UNDERSTANDING(S)

Energy is necessary for change to occur.

The motion of an object is affected by the force applied.

CONTENT/SKILLS DEVELOPED IN GRADE 6

ENERGY:

- 1) Students will understand the difference between energy and matter
- 2) All energy can be stored (potential), transferred or transformed (kinetic), but energy cannot be destroyed.
- 3) Students will identify different forms of energy: heat, light, sound, electrical, mechanical, nuclear, magnetic
- 4) Students will understand how energy travels from one place to another
- 5) Students will demonstrate how one form of energy can be transformed to another form of energy
- 6) Students will understand that heat energy moves from warmer to cooler regions via radiation, conduction, and convection
- 7) Students will understand how sound energy is created, how it travels and how different sounds are produced.
- 8) Students will identify instances when light is reflected, refracted, and absorbed.
- 9) Students will demonstrate their understanding that color is part of the visible spectrum on the electromagnetic spectrum.

FORCES:

- 1) Students will recognize that when a force is applied to an object, it will react in one of three ways: it can speed up, slow down, or change direction.
- 2) Students will describe the relationship between the strength of the force on an object and the resulting effect. The greater the force, the greater the change in motion

MOTION:

- 1) Demonstrate how unbalanced and balanced forces relate to an object's motion.
- 2) Students will demonstrate an understanding of Newton's laws of motion.

VOCABULARY:

Introduced

Pitch

Mastered

Potential energy

Kinetic energy

Unbalanced vs. balanced

Vibration

Frequency

Wavelength

Radiant

Electromagnetic

Gravitational pull

Friction

Normal force

Refraction

Reflection

Absorption

Prism

Spectrum

Speed

Acceleration

Velocity

Momentum

Opaque

Transparent

Translucent